We are surrounded by embedded real-time systems: our phone, car, washing machine, and many more. Due to limited resources, these systems often include adaptation mechanisms to trade-off performance for efficiency. The present dissertation determines conditions under which these adaptive real-time systems are stable, meaning that the system’s resource usage is controlled under all possible run-time scenarios.

Stability implies a bounded worst-case behavior of the system and can be linked with classic real-time systems’ properties such as bounded response times for the software applications. In the case of distributed systems, the stability problem is particularly hard because software applications distributed over the different resources generate complex, cyclic dependencies between the resources, that need to be taken into account.